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PATENT APPLICATION

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of

Docket No: Q62230

Takayuki YAMAMOTO , et al.

Appln. No.: 09/735,892

Group Art Unit: 1771

Confirmation No.: 5759

Examiner: Daniel R. Zirker

Filed: December 14, 2000

For: REMOVABLE PRESSURE-SENSITIVE ADHESIVE SHEET

SUBMISSION OF APPEAL BRIEF

MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents

P.O. Box 1450

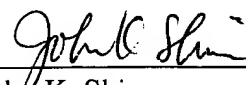
Alexandria, VA 22313-1450

Sir:

Submitted herewith please find an Appeal Brief. A check for the statutory fee of \$500.00 is attached. The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account. A duplicate copy of this paper is attached.

Respectfully submitted,

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Date: April 8, 2005



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APPEAL BRIEF UNDER 37 C.F.R. § 41.37

MAIL STOP APPEAL BRIEF - PATENTS

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellant submits the following:

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· APPEAL BRIEF UNDER 37 C.F.R. § 41.37
U.S. APPLN. NO. 09/735,892

Q62230

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is NITTO DENKO CORPORATION of Osaka, Japan. The assignment was recorded on December 14, 2000 at Reel 011394, Frame 0195.

II. RELATED APPEALS AND INTERFERENCES

To the knowledge of the Appellants, Appellants' representatives and assignee, there are no known related appeals or interferences that i) are related to the present appeal, ii) would affect or be affected by the outcome of this appeal, or iii) or would have any bearing on the outcome of this appeal.

III. STATUS OF CLAIMS

Claim 5-6 remain pending in the application.

Claims 1-4 have been cancelled.

The rejections of claims 5-6 are being appealed.

IV. STATUS OF AMENDMENTS

Claim 5 was previously amended under 37 C.F.R. § 1.116 on February 4, 2004, and then further amended under 37 C.F.R. § 1.114(c), which was filed along with a Request for Continued Examination (RCE), on March 2, 2004.

In the Office Action mailed May 4, 2004, the Examiner stated that Applicants' RCE application appeared to have both entered the after final rejection amendment (which was proposed but not entered in the Advisory Action mailed February 20, 2004) as well as the amendment under 37 C.F.R. § 1.114(c) filed March 2, 2004, with the resultant effect being that the pending claims assertedly contain a significant number of serious informalities.

Applicants attempted to clarify the confusion in the Amendment filed on August 4, 2004, which included an amendment to Claim 5.

The Examiner notes in the Final Office Action mailed October 12, 2004, that due to the confusion over the amendments to Claim 5, the presented Claim 5 was renumbered as Claim 6, but that Claim 5, reciting "final polymer" was still pending.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Claim 5 is drawn to a semiconductor processing method. Page 4, lines 20-27, of the specification. The semiconductor processing method comprises adhering a removable pressure-sensitive adhesive sheet to a front or back surface of the wafer, and processing the wafer. Page 4, lines 15-20.

The removable pressure-sensitive sheet comprises a pressure-sensitive adhesive layer comprising a final polymer constituting a pressure-sensitive adhesive in which the final polymer content of low-molecular components having a molecular weight of 10^5 or lower is 10% by weight or lower. Page 5, second full paragraph; page 8, lines 10-14.

The final polymer has a weight average molecular weight of 930,000 to 2,100,000. Pages 18-19, see Reference Examples 5-6; page 8, lines 14-16.

Similarly, Claim 6 is drawn to a semiconductor processing method. Page 4, lines 20-27, of the specification. The semiconductor processing method comprises adhering a removable pressure-sensitive adhesive sheet to a front or back surface of the wafer, and processing the wafer. Page 4, lines 15-20.

The removable pressure-sensitive sheet comprises a pressure-sensitive adhesive layer which is made of at least a pressure-sensitive adhesive comprising an obtained polymer in which the content of low-molecular components having a molecular weight of 10^5 or lower is 10% by weight or lower. Page 5, second full paragraph; page 8, lines 10-14.

The obtained polymer has a weight average molecular weight of 930,000 to 2,100,000. Pages 18-19, see Reference Examples 5-6; page 8, lines 14-16.

The obtained polymer is an acrylic polymer obtained by polymerizing one or more monomers in liquid or supercritical carbon dioxide. Page 8, lines 14-16; page 6, lines 13-16.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on appeal include the following rejections of claims 5-6:

Claims 5-6 are rejected under 35 U.S.C. 112, second paragraph.

Claims 5-6 are rejected under 35 U.S.C. § 103 as being unpatentable over EP 0 818 470 A1 in view of Appellants' disclosure and in view of DeSimone et al. (U.S. Pat. No. 5,824,726).

VII. ARGUMENT

Claim Rejections Under 35 U.S.C. § 112

A. Claim 5 is rejected by the Examiner, stating in the Final Office Action: "It is noted that the presently pending independent claim 5 contains both the very indefinite and confusing term 'final' polymer (which may also be new matter) and it is also noted that there is an apparent typographical error which is present in line 5 where it was stated that there is a 'molecular weight of 105 or lower', instead of what is clearly proper and is now presented in the new renumbered claim 6, --a molecular weight of 10^5 or lower--." See Final Office Action, mailed October 12, 2004, at page 2, lines 13-20.

B. Claim 6 is rejected under 35 U.S.C. § 112, second paragraph, as assertedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellants regard as the invention, particularly the characterization of the new polymer as "an obtained" polymer or "the obtained" polymer is assertedly informal.

The Examiner notes that regarding Appellants' obtained polymer at the end of the reaction and weight-average molecular weight based on obtained polymers versus EP 0 818 470's disclosure of "pre-reaction acrylic polymers" having a certain molecular weight range, the Examiner believes that there is no reason why, e.g., there cannot be more than one reaction both now and/or later, and asserts that the use of "obtained" is vague, indefinite and confusing.

Appellants respectfully request that the Board reverse these rejections for the following reasons.

The standard for definiteness is an objective one because it is not dependent on the views of the applicant or any particular individual, but is evaluated in the context of whether the scope of the claim is clear to a hypothetical person possessing the ordinary level of skill in the pertinent art.

Appellants respectfully submit that the phrases “final polymer” and/or “obtained polymer” in Claims 5-6, respectively, are fully described in the specification, are not new matter, and are in accordance with the requirements of 35 U.S.C. § 112, second paragraph.

The phrase “obtained polymer” in the phrase “a pressure-sensitive adhesive comprising an obtained polymer” of Claim 6 refers to the final polymer products obtained from a polymerization reaction from which the pressure-sensitive adhesive is formed. The obtained polymer can be measured for its content of low-molecular components, and can also be measured to determine the obtained polymer’s weight average molecular weight. Such phrase finds support, for example, at page 8, lines 14-16; at page 11, lines 13-19; and in the description of obtaining the polymers of Reference Examples 5-6 at pages 18-19. Similarly, Appellants respectfully submit that the phrase “final polymer” of Claim 5 finds support, for example, at the same citations given above.

Appellants submit that since the scope of the claimed subject matter can be clearly determined by one having ordinary skill in the art, a rejection under 35 U.S.C. § 112, second paragraph, for the reason given by the Examiner is not appropriate.

Accordingly, Appellants respectfully request reversal of the rejections under 35 U.S.C. §112, second paragraph.

Rejection of Claims Under 35 U.S.C. § 103

A. Claim 5 is rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over EP 0 818 470 to Oka et al. (hereinafter EP '470) taken in view of Appellants' alleged admissions in the specification regarding the usage of pressure sensitive adhesive sheets in semiconductor processing operations, and further in view of De Simone et al. (U.S. Pat. No. 5,824,726)

B. Claim 6 is rejected under 35 U.S.C. § 103(a) as assertedly being unpatentable over EP '470 taken in view of Appellants' alleged admissions in the specification.

The Examiner maintains that the claimed *weight average* molecular weight range of 930,000 to 2,100,000 is believed to at the very least intersect with the preferred *number average* MW range of 100,000 to 500,000, assertedly taught by EP '470 (see page 7, line 6), as evidenced by the text of "Organic Coatings: Science and Technology", Volume 1, 1992, page 51, wherein the 2/1 minimum theoretical relationship taught as existing between the two MW ranges leads to the Examiner's conclusion that at least the upper range taught by the reference overlaps with at least the lower part of Appellants' claimed range.

The Examiner relies upon De Simone et al. as evidence of the state of the art disclosing that the resultant properties of acrylic adhesives produced by polymerizing one or more monomers in liquid or supercritical carbon dioxide to form acrylic polymers suitable for usage in

reactions forming pressure sensitive adhesives such as set forth in EP '470 are assertedly well known in the art.

Appellants traverse the rejections as follows.

Appellants respectfully submit that it would be improper to continue to reject the claims under 35 U.S.C. § 103(a), as obvious over EP '470 in view of Appellants' disclosure and in view of DeSimone et al. Given the remarks provided below, and as demonstrated by the Examples in the specification, and considering the specific discussion of the results and advantages set forth, for example, in detail at pages 22-23, it is respectfully submitted that any inference of *prima facie* obviousness is rebutted.

Appellants' invention relates to a semiconductor wafer processing method involving a removable pressure-sensitive adhesive sheet which, when used as, e.g., a radiation-curable pressure-sensitive adhesive sheet for semiconductor wafer processing, has high tackiness during processing such as grinding or dicing to facilitate the processing and, after the processing, can be made easily removable, through curing by irradiation, without causing wafer breakage, etc. Furthermore, this pressure-sensitive adhesive sheet neither emits a strong odor upon curing nor leaves a fouling adhesive residue on the order of micron or submicron. In particular, there is no possibility that the chip back side/encapsulating resin separation attributable to such wafer back side fouling might occur.

Appellants have discovered that when a pressure-sensitive adhesive sheet which uses a pressure-sensitive adhesive layer comprising a base polymer having a low content of low-molecular polymeric components having a molecular weight of 100,000 (10^5) or lower is 10% by

weight or lower, then the pressure-sensitive adhesive layer does not cause organic fouling of articles. Namely, Appellants have found that this pressure-sensitive adhesive sheet, when used for semiconductor wafer processing, is highly effective in inhibiting the chip/encapsulating resin separation attributable to such organic fouling.

Furthermore, when the obtained polymer is an acrylic polymer obtained by polymerizing one or more monomers in liquid or supercritical carbon dioxide, a high-molecular polymer is obtained which has a lower content of low-molecular components than conventional polymers synthesized with organic solvents. Consequently, by using such a polymer as an adhesive base polymer, a pressure-sensitive adhesive can be obtained which is excellent in both cohesive force and adhesive strength and is reduced in the fouling of adherends.

A. There is no motivation to combine the teachings of EP '470 with Appellants' disclosure or with DeSimone et al. to support the §103 rejection of independent claims 5-6.

The Examiner recognizes that EP '470 fails to teach the usage of PSA sheets in semiconductor processing operations, and then cites to Appellants' specification at pages 1-2 as correcting this deficiency. Appellants submit the motivation to combine EP '470 and Appellants' disclosure is improper for at least the following reasons.

EP '470 discloses a process for preparing a solvent-type acrylic pressure-sensitive adhesive. More particularly, a monomer composition containing alkyl (meth)acrylate ester as its main component is subjected to solution polymerization under a closed condition at least in a latter stage of the polymerization reaction. See Abstract. That is, EP '470 discloses solution

polymerization, but does not disclose the use of liquid or supercritical carbon dioxide as a diluent. Furthermore, EP '470 only discloses applications in the medical field.

Appellants require the use of liquid or supercritical carbon dioxide, but optionally allow a small amount of an organic solvent for the purpose of miscibility improvement, etc., if used at all (see page 9, lines 11-14).

Appellants traverse the rejection on the basis that the combination of EP '470 with Appellants' disclosure is not suggested or motivated to achieve the present inventions of claims 5-6. Although the prior art referred to in the specification relates to the semiconductor processing art, this disclosure is in a separate field of invention from the prior art disclosing a "removable pressure sensitive adhesive sheet" for use in the medical field, particularly as a medical adhesive applied to human skin such as in EP '470. The performance properties of a PSA used in the semiconductor processing art compared to the performance properties of a medical adhesive as applied to human skin are substantially different such that the combination of the Examiner's references is not suggested or motivated.

For example, a medical adhesive as applied to human skin would presumably not be exposed to the typical semiconductor processing steps of, for example, grinding or dicing, acid etching, and irradiation curing. Therefore, Appellants submit that the combination of references cited by the Examiner are improper based on a lack of suggestion to combine them.

EP '470 and Appellants' disclosure utilize completely different methods of forming acrylic polymers and also different methods of using the PSAs. Therefore, Appellants submit that there is no suggestion nor motivation to combine EP '470 with Appellants' disclosure.

Because the combination of EP '470 and Appellants' disclosure is inappropriate for at least the above reasons, Appellants request withdrawal of the rejections of independent Claims 5-6.

The Examiner also recognizes that EP '470 fails to teach the usage of liquid or supercritical carbon dioxide in the polymerization reaction, and then cites to DeSimone et al. as correcting this deficiency. Appellants submit the motivation to combine EP '470 and DeSimone is improper for at least the following reasons.

DeSimone et al. provides for a multi-phase polymerization process for making a water insoluble polymer, including (1) providing a mixture comprising carbon dioxide and an aqueous phase, and containing a monomer and a polymerization initiator, and (2) polymerizing the monomer in the reaction mixture. See Abstract.

The references relate to different types of polymerization reactions. EP '470 is still a solution polymerization (see page 4, lines 6-9) whereas DeSimone provides a mixture comprising carbon dioxide and an aqueous phase. Thus, the operational incompatibility in these polymerization reactions underscores the clear use of hindsight construction in maintaining the rejection of the claims. The references teach away from their combination with each other at a fundamental level. Nor is it clear that the "invention" of EP '470 could even be modified to utilize liquid or supercritical carbon dioxide.

Because EP '470 pertains to solution polymerization, it is not obvious to remove the solution in favor of using DeSimone's multi-phase polymerization process.

As the combination of EP '470 and DeSimone et al. is inappropriate for at least the above reasons, Appellants requests withdrawal of the rejections of independent Claims 5-6 under 35 U.S.C. § 103(a).

B. The combination of EP '470 in view off Appellants' disclosure and DeSimone does not teach that the obtained polymer has a weight average molecular weight range of 930,000 to 2,100,000. (claims 5-6).

Appellants claim, e.g., that the obtained polymer has a weight average molecular weight of 930,000 to 2,100,000. The Examiner asserts that EP '470 discloses a number average molecular weight range of 100,000 to 500,000, which converts to a weight average molecular weight range of 200,000 to 1,000,000, thereby overlapping with Applicants' claimed range and assertedly supporting the *prima facie* case of record.

The present invention measures the molecular weight of the obtained polymer at the end of the polymerization reaction to determine the content of low molecular weight components. It is clear from the disclosure that Appellants' claim a weight-average molecular weight range based on obtained polymers versus EP '470 disclosure of pre-reaction acrylic copolymers having a number average molecular weight range of 100,000 to 500,000.

The obtained polymer from the polymerization reaction is described, for example, in the Reference Examples of the present application. Reference Example 5 on page 18 states, "Thus, a polymer solution of Reference Example 5 was obtained. [next paragraph] This polymer had a weight-average molecular weight of as determined by gel permeation chromatography of 930,000." And also, Reference Example 6 on pages 18-19 states, "After the contents were

emulsified, emulsion polymerization was conducted to obtain an aqueous dispersion of Reference Example 6. [next paragraph] This polymer (sol) had a weight-average molecular weight as determined by gel permeation chromatography of 2,100,000.” Thus, it is clear from the disclosure that Appellants’ claim a weight-average molecular weight range based on obtained or post-reaction (vs. pre-reaction) polymers.

In contrast, EP ‘470 discloses pre-reaction acrylic copolymers having a number average molecular weight range of 100,000 to 500,000 and does not disclose final values of the polymer. EP ‘470 discloses, “[A] solvent-type acrylic pressure-sensitive adhesive includes **as its main component** an acrylic copolymer having a number average molecular weight ranging from 10,000 to 500,000....Preferably, the acrylic copolymer has a number average molecular weight ranging from 100,000 to 500,000. In this case, a monomer composition for constituting the acrylic copolymer preferably includes 0.1-10 weight % of hydroxyl- and carboxyl-containing monomers. More preferably, the monomer composition includes 0.01-3 weight % of hydroxyl-containing monomer and 1-10 weight % of carboxyl-containing monomer.” (emphasis added) (see EP ‘470, bridging paragraph of pages 6-7).

Thus, EP ‘470 describes monomer components prior to reaction, and the Examiner has improperly relied upon such weight %’s of pre-reaction components as disclosing Appellants’ post-polymerization reaction requirement of “an obtained polymer in which the content of low-molecular components having a molecular weight of 10^5 or lower is 10% by weight or lower”.

For the foregoing reasons, Appellants respectfully submit that nothing in EP ‘470 or any other cited reference discloses or suggests individually or in combination thereof at least an

obtained or final polymer (post-polymerization reaction) with a weight average molecular weight of 930,000 to 2,100,000.

DeSimone does not correct this deficiency. Therefore, Claims 5-6 are patentable for at least this reason, and reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) are respectfully requested.

C. The combination of EP '470 in view of Appellants' disclosure and in view of DeSimone et al. does not teach a polymer in which the content of low-molecular components have a molecular weight of 10^5 or lower is 10% by weight or lower, and also having a weight average molecular weight of 930,000 to 2,100,000.

Appellants emphasize the criticality of the requirement that the weight average molecular weight is 930,000 to 2,100,000, combined with the additional requirement that the content of low-molecular components having a molecular weight of 10^5 or lower is 10% by weight or lower. The Examiner believes that the less than 10% parameter is both an inherent property of at least some of the disclosed compositions as well as, alternatively, an obvious modification to one of ordinary skill in the art for the advantages attained, such as, by resource saving and improved environmental health (See Office Action, mailed October 23, 2002, paragraph 3).

Appellants submit that the 10% parameter is not an inherent property, that the claimed range is critical to achieving specific benefits of the pressure-sensitive adhesive layer of the present invention, and that none of the cited references teaches or suggests this criticality.

A high-molecular polymer reduced in the content of low-molecular components as presently claimed affords the following advantages. The pressure-sensitive adhesive layer is

excellent in not only cohesive force but adhesive strength. In addition, the removable pressure-sensitive adhesive sheet, when used for fixing adherends thereto in work processing or the like, has such a degree of moderate tackiness so as not to peel off the adherends. After the work processing or the like, this pressure-sensitive adhesive sheet can be easily removed from the adherends without fouling them. In particular, the removable pressure-sensitive adhesive sheet, when used as, e.g., a radiation-curable pressure-sensitive adhesive sheet for semiconductor wafer processing, has high tackiness during processing such as grinding or dicing to facilitate the processing and, after the processing, can be made easily removable, through curing by irradiation with a radiation, without causing wafer breakage, etc. Furthermore, this pressure-sensitive adhesive sheet neither emits a strong odor upon curing nor leaves a fouling adhesive residue on the order of micron or submicron. Consequently, there is no possibility that the chip back side/encapsulating resin separation attributable to such fouling might occur.

Furthermore, Appellants submit that EP '470 fails to recognize or appreciate that the content of the low molecular weight components is a result-effective factor. In this circumstance, the Examiner cannot legally rely on a position that it would simply have been obvious to optimize the amount thereof, since the reference fails to expressly disclose this claim element, much less suggest that it is a parameter which can be controlled to produce the advantages described in the present specification.

D. The combination of EP '470 in view off Appellants' disclosure and DeSimone et al. does not teach that the obtained polymer is an acrylic polymer obtained by polymerizing one or more monomers in liquid or supercritical carbon dioxide (Claim 6).

Claim 6 recites the product-by-process where the “obtained polymer is an acrylic polymer obtained by polymerizing one or more monomers in liquid or supercritical carbon dioxide.”

Appellants emphasize that the product-by-process element produces a patentably distinct PSA sheet/layer which is used in the claimed process. The specification states the following important benefits of using carbon dioxide as a diluent:

“The use of carbon dioxide as a diluent not only is effective in keeping the system at a low viscosity throughout the polymerization due to its diluting effect to improve the efficiency of stirring, but also inhibits radical chain transfer. Because of this, a high-molecular polymer is obtained which has a lower content of low-molecular components than conventional polymers synthesized with organic solvents. Consequently, by using such a polymer as an adhesive base polymer, a pressure-sensitive adhesive can be obtained which is excellent in both cohesive force and adhesive strength and is reduced in the fouling of adherends.”

(Page 8, last line to page 9, line 14).

Appellants respectfully submit that nothing in EP ‘470 or any other cited reference discloses or suggests individually or in combination thereof at least an *obtained* polymer (vs. a pre-reaction polymer) with a weight average molecular weight of 930,000 to 2,100,000 and the additional element that the obtained polymer is an acrylic polymer obtained by polymerizing one

or more monomers in liquid or supercritical carbon dioxide. Further neither EP '470 nor any other art teach or suggest the above-quoted benefits and advantages obtained when polymerization takes place in liquid or superficial CO₂.

Therefore, Appellants submit that at least one, if not both, of the rejections of Claim 5 or Claim 6 should be reversed.

Conclusion

In view of the foregoing, Appellant submits that the pending rejection over EP '470 and Appellants' disclosure and DeSimone et al., and the pending rejection under 35 U.S.C. § 112, second paragraph, should be withdrawn.

Unless a check is submitted herewith for the fee required under 37 C.F.R. §41.37(a) and 1.17(c), please charge said fee to Deposit Account No. 19-4880.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

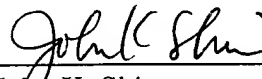
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23373

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Date: April 8, 2005

CLAIMS APPENDIX

CLAIMS 5-6 ON APPEAL:

Claims 1-4 (canceled).

5. A semiconductor wafer processing method, comprising adhering a removable pressure-sensitive adhesive sheet wherein a pressure-sensitive adhesive layer comprises a final polymer constituting a pressure-sensitive adhesive in which the final polymer content of low-molecular components having a molecular weight of 10⁵ or lower is 10% by weight or lower, and the final polymer has a weight average molecular weight of 930,000 to 2,100,000, to a front or back surface of the wafer, and processing the wafer.

6. A semiconductor wafer processing method, comprising adhering a removable pressure-sensitive adhesive sheet which comprises a pressure-sensitive adhesive layer which is made of at least a pressure-sensitive adhesive comprising an obtained polymer in which the content of low-molecular components having a molecular weight of 10⁵ or lower is 10% by weight or lower, and the obtained polymer has a weight average molecular weight of 930,000 to 2,100,000, to a front or back surface of the wafer, and processing the wafer,

wherein the obtained polymer is an acrylic polymer obtained by polymerizing one or more monomers in liquid or supercritical carbon dioxide.

EVIDENCE APPENDIX:

Pursuant to 37 C.F.R. § 41.37(c)(1)(ix), submitted herewith are copies of any evidence submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 or any other evidence entered by the Examiner and relied upon by Appellant in the appeal.

None

RELATED PROCEEDINGS APPENDIX

Submitted herewith are copies of decisions rendered by a court or the Board in any proceeding identified about in Section II pursuant to 37 C.F.R. § 41.37(c)(1)(ii).

None